Abstract

Artificial Neural Network (ANN) based model has been proposed for diagnosis of process mean shift. These are mainly generalized-based where only a single classifier was applied in the diagnosis of abnormal pattern. In this paper, we analyze the performance of a combined recognizer consisting of small-sized artificial neural networks on varying number of nodes in the hidden layer trained with Levenberg Marquardt and Quasi-Newton Algorithm. The results of our study illustrate the effectiveness of the combined recognizer and showed that combined recognizer performed better when number of hidden nodes is small, say, less than 15 in terms of recognition accuracies and mean square error as compared to the single recognizer.

References

- Chen L. H and Wang T. Y 2004. Artificial Neural Networks to classify mean shifts
  Characteristics in a Multivariate Manufacturing Environment,&quot; Communication in
- Guh, R. S 2007. Online Identification and Quantification of Mean Shifts in Bivariate
  Process using a Neural Network-based Approach. Quality and Reliability Engineering
  International 23, 367-385.
- Healy J. D 1987 A note on multivariate CUSUM procedures Technometrics 29,409- 412

- Hotelling, H., 1947. Multivariate Quality Control-Illustrated by the Air Testing of Sample
  Bombsights,&quot; Techniques of Statistical Analysis (Eisenhart, C., Hastay, M. W., and
- Jackson, J. E. 1985 Multivariate quality control. Communications in
  multivariate exponentially weighted moving average control chart. Technometrics 34, 46–53
  weather forecasting. Neural Computing and Application 13, 112-122.
- Maravelakis P. E, Bersimis S, Panaretos J and Psarakis S. 2002. Identifying the out of
  control variable in a multivariate control chart. Communication in Statistics-Theory and Method
  31(12), 2391–2408
- Mason, R. L., Tracy, N. D. and Young, J. C. 1995. Decomposition of T2 for
  interpreting multivariate T2 control chart signals. Journal of Quality Technology, 29, 396–406
- Murphy, B. J. 1987. Selecting out of control variables with the T2 multivariate quality
- Pham, D. T and Ozturmel, E 1992. Control Chart pattern Recognition using neural
  networks. Journal of system Engineering. 2, 256-262
  International Journal of Production Research 35(7),1875-1890
  Computers and Industrial Engineering 33,113–116
- Wani ,M. A and Pham, D. T. 1999. Efficient control chart pattern recognition through
  synergistic and distributed artificial neural network. Proc. Insn Mech Engrs 213 Part B,
  157-169

Index Terms
Pattern Recognition of Process Mean Shift using Combined ANN Recognizer

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